

GTR-82

Generator Controller

Owner's Manual



Web Site : <http://www.monicon.com.tw>

E-mail : sales@monicon.com.tw

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1 Introduction

1.1 GTR-82 Panel

1.1.1 Indicators

- Power
- Run
- Stop
- Trip
- Alarm
- Over Crank
- High Water Temp.
- Over Speed
- Low Oil Pressure

1.1.2 Rotary Switch Function

- Network

Allow online authorized user entry to perform monitoring and control.

- ATS

The engine starts automatically, when shorted ATS1 and ATS2 terminal behind the controller under ATS mode.

- Manual

User starts the engine directly.

- Off

Shutdown the engine or forbid start function.

1.1.3 Push-Button Function

- PAGE

Change LCD display page for reading more information.

- Light Test

Test lights for solid, clear and brightness. It also tests alarm.

- Reset

1. First time "Reset" shutdown the alarm. Second time "Reset" clears fault lights.
2. Holding down for a longer period will produce 1st and 2nd time "Reset" functions.
3. Turn on the LCD backlight.



Figure 1 – GTR82 Panel

1.2 Wire Terminal

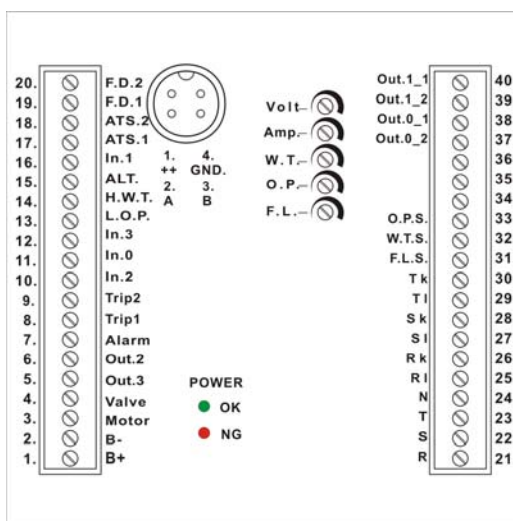







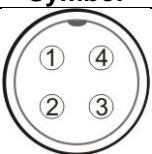


Figure 2 – GTR82 wire terminal

Table 1 – GTR82 back description

| Continental terminal description | | | | | |
|---|----------|---|--|------------|--|
| | Symbol | Description | | Symbol | Description |
| 1 | ++ | DC power (Battery +) | 21 | R | Analog input, R phase volt |
| 2 | GND | Ground (Battery -) | 22 | S | Analog input, S phase volt |
| 3 | Motor | Output, starter relay | 23 | T | Analog input, T phase volt |
| 4 | Valve | Output, fuel valve relay | 24 | N | Analog input, N phase volt |
| 5 | Output 3 | Output, Aux 3 relay | 25 | R.CT. L | Analog input, R line current (L) |
| 6 | Output 2 | Output, Aux 2 relay | 26 | R.CT. S | Analog input, R line current (S) |
| 7 | Alarm | Output, alarm relay | 27 | S.CT. L | Analog input, S line current (L) |
| 8 | Trip 1 | Output, electrical trip relay | 28 | S.CT. S | Analog input, S line current (S) |
| 9 | Trip 2 | Output, electrical trip relay | 29 | T.CT. L | Analog input, T line current (L) |
| 10 | Input 2 | Digital input, Aux 2 switch | 30 | T.CT. S | Analog input, T line current (S) |
| 11 | Input 0 | Digital input, Aux 0 switch | 31 | F.L. Sen. | Analog input, Fuel level sensor (option) |
| 12 | Input 3 | Digital input, Aux 3 switch | 32 | W.T. Sen. | Analog input, Water temp. sensor |
| 13 | L.O.P. | Digital input, Low oil press. switch | 33 | O.P. Sen. | Analog input, Oil pressure sensor |
| 14 | H.W.T. | Digital input, High water temp. switch | 34 | Spare | Spare |
| 15 | ALT. | Digital input, Alternator plus | 35 | Spare | Spare |
| 16 | Input 1 | Digital input, Aux 1 switch | 36 | Spare | Spare |
| 17 | ATS 1 | Digital input, shorted with ATS2 | 37 | Output 0_2 | Output, Aux. 0 relay |
| 18 | ATS 2 | Digital input, shorted with ATS1 | 38 | Output 0_1 | Output, Aux. 0 relay |
| 19 | F.D. 1 | Analog input, Frequency detect terminal | 39 | Output 1_2 | Output, Aux. 1 relay |
| 20 | F.D. 2 | Analog input, Frequency detect terminal | 40 | Output 1_1 | Output, Aux. 1 relay |
| VARIABLE REGISTER DESCRITOPN | | | | | |
| Symbol | | Description | Symbol | | Description |
| Volt –  | | AC voltage calibration | O.P. –  | | Oil Pressure calibration |
| Amp. –  | | AC Ampere calibration | F.L. –  | | Fuel Level calibration |
| W.T. –  | | Water Temp. calibration | | | |
| DC POWER STATUS DESCRIPTION | | | | | |
| Symbol | | Description | | | |
|  OK | | OK: Solid “green” LED | | | |
|  Reverse | | DC power polarity fault | | | |
| RS-485 COMMUNICATION PORT | | | | | |
| Symbol | | Description | | | |
|  | | 1. Battery + | | | |
| | | 2. A | | | |
| | | 3. B | | | |
| | | 4. GND | | | |

Note:

1. Output Relay function can be changed according users requirements.
2. Output Trip Relay is intended to be used to trip the Breaker or AVR filed current in order to cut off load to the generator.
3. VRs are adjustment for matching tolerance between external and internal measuring meter readout.

1.3 CASE DIMENSIONS

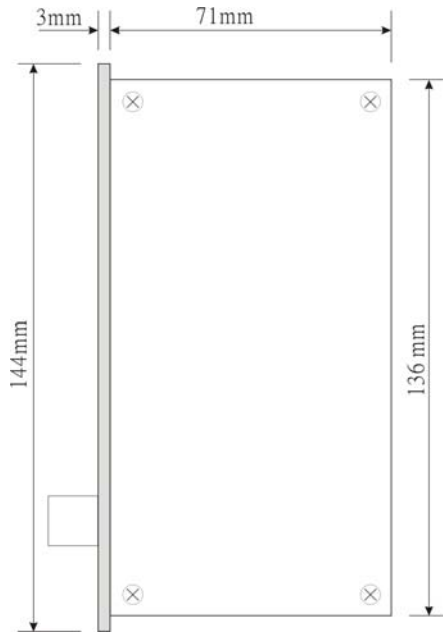


Figure 3 – GTR82 side view

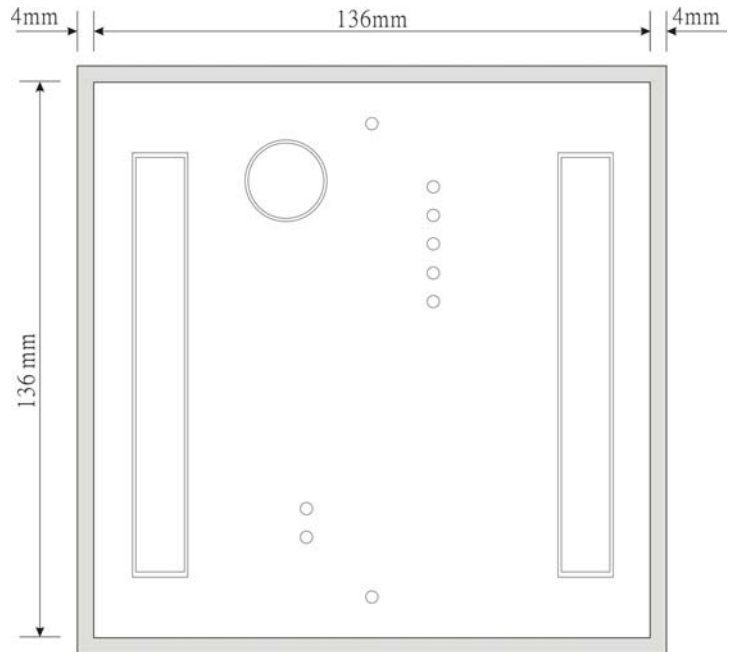


Figure 4 – GTR82 back view

1.4 Specifications

1.4.1 General

- DC Supply:
8 ~ 36 VDC
- Power Consumption:
Max. 10 W
- Measuring Voltage:
10 ~ 300 VAC (Phase to Neutral, Accuracy 1.5 %)
- Measuring Current:
.. /5 A (secondary current readout below 0.15 A shows zero on LCD display. Accuracy 1.5 %)
- Measuring Frequency:
0 ~ 80 Hz (Min AC Volt: 8 V)
- Charger AC Output Voltage Sensitivity:
3 V ~ 70 V Peak to Peak
- Charger AC Output Frequency Sensitivity:
62 Hz ~ 10,000 Hz
- Relay Output:
10 A /30 VDC
- Software Platforms:
Windows 98, Windows ME, Windows 2000, Windows XP (recommend)
- Communication Protocol:
RS-485 (Dynamic encryption by Monicon technology)

■ Operating Temperature Range:

-30 °C ~ +70 °C

■ Dimension (W x H x D):

144 mm x 144 mm x 74 mm

■ Panel Cut-out (W x H):

138 mm x 138 mm

■ Weight:

1.4 Kg (3.08 lb.)

1.4.2 Controller Function

■ LCD display :

1. Three phase-phase voltage
2. Three line current
3. Three phase-neutral voltage
4. Frequency
5. RPM
6. Battery Voltage
7. Run hours
8. Coolant Temperature
9. Oil Pressure
10. PF
11. KW
12. KWH
13. KVAR

14. KVA

1.4.3 Network function:

- Remote start/stop the controller by two wires network circuitry
- Parameter setting and reading
- Input and output monitor
- Fault history readout
- Data acquisition can be done from a remote site

1.4.4 Panel function:

- Manual start / stop engine.
- Automatically start / stop engine by ATS.
- Reset the controller.
- Light test.

1.4.5 Protection function:

- Engine respect:
 1. Over crank protection
 2. Low oil pressure protection
 3. High water temperature protection

4. Low water level protection

5. Over speed protection

- Generator respect:

1. Over load protection
2. Short circuit protection
3. Over voltage protection
4. Under voltage protection
5. High frequency protection
6. Low frequency protection

- Battery respect:

1. Low battery indicator/ alarm
2. High battery indicator/ alarm
3. Charge failure indicator
4. Start prohibit on weak battery power

- Peripheral respect:

1. Lower fuel level protection
2. Aux. 2
3. Aux. 3

1.5 Wiring

1.5.1 Wiring example

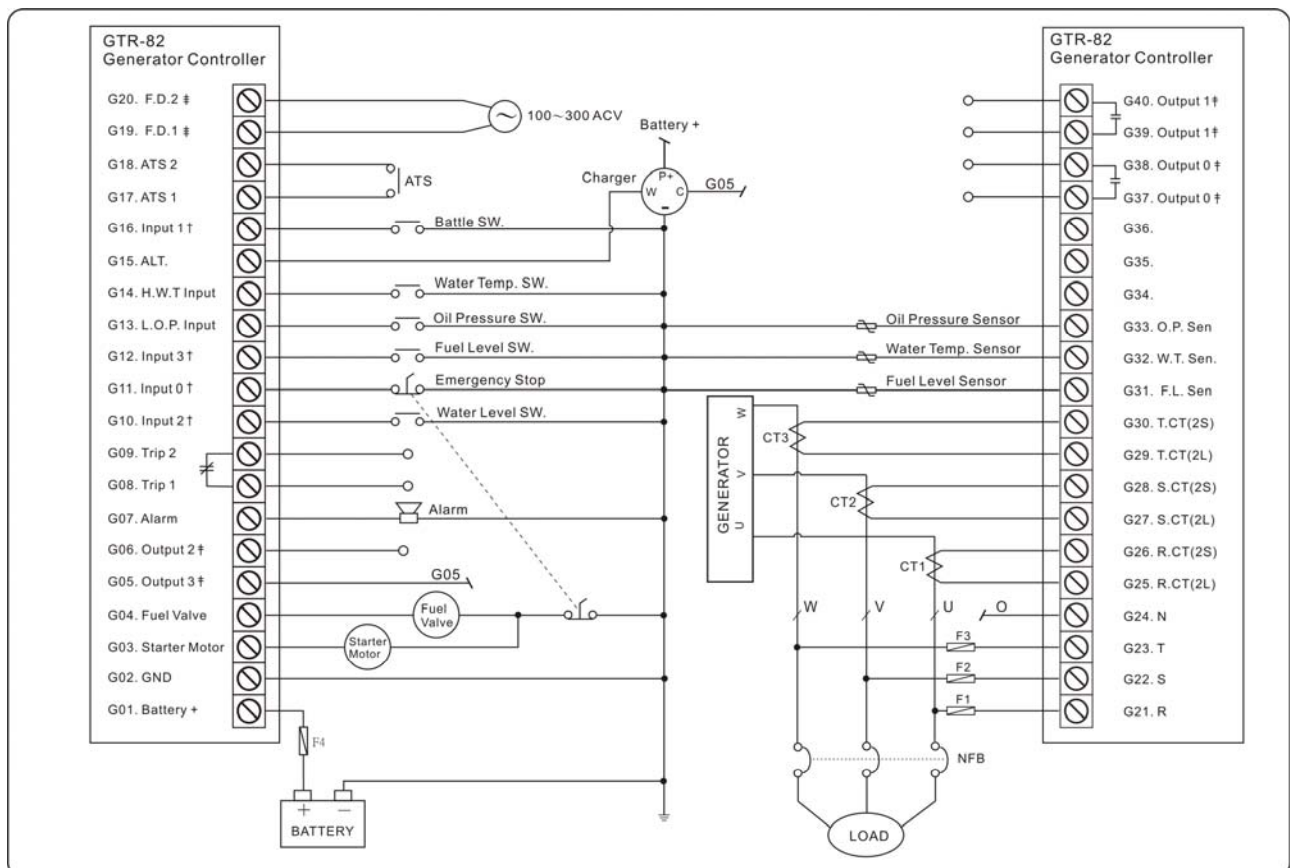


Figure 5 – GTR82 wiring diagram

1.5.2 Connection in short distance

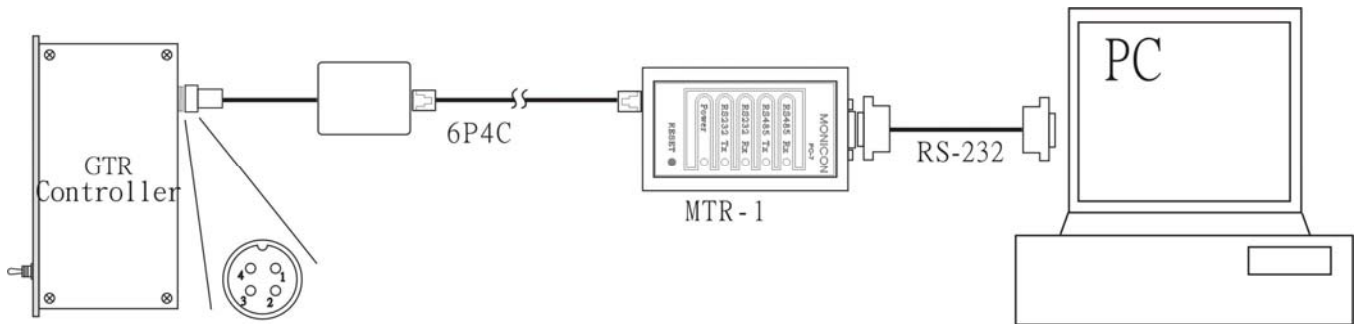


Figure 6 – GTR82 local connection diagram

1.5.3 Connection with modem

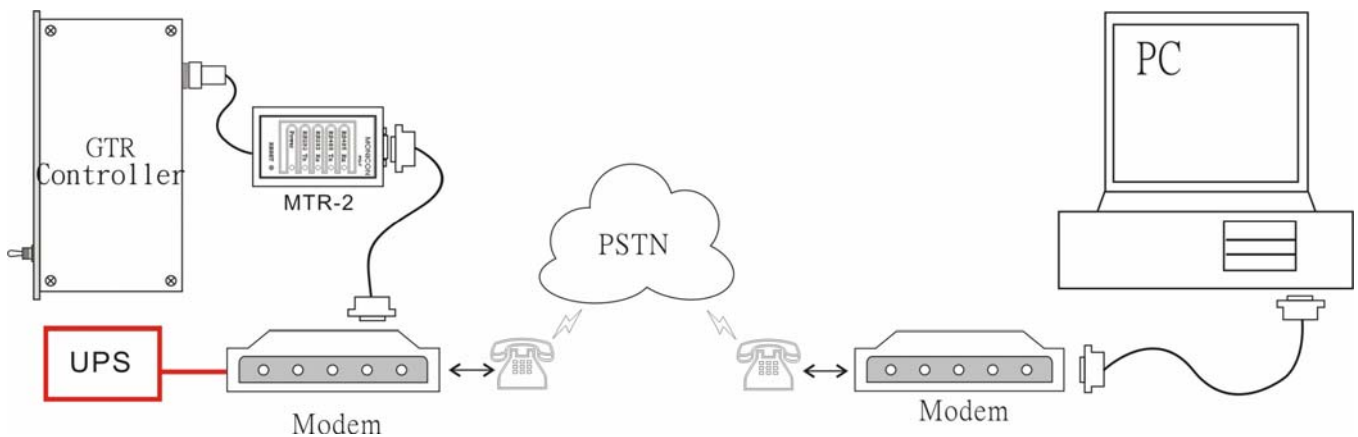
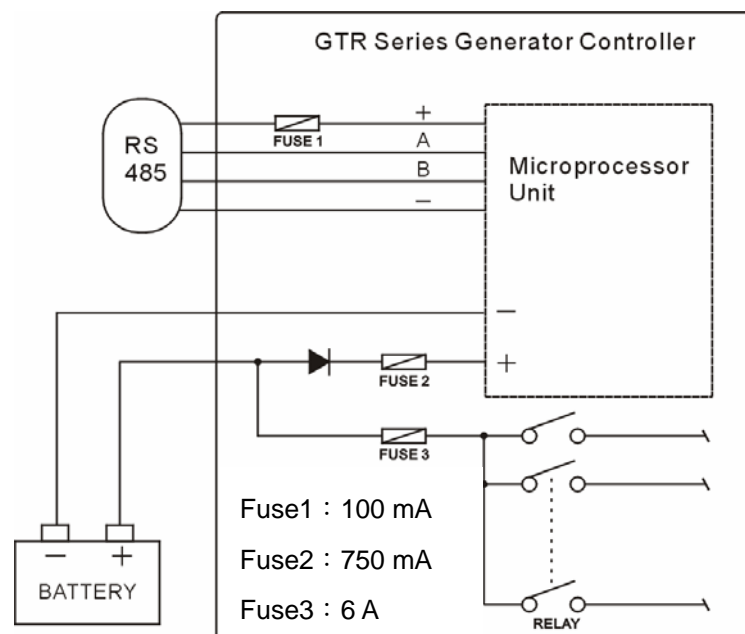


Figure 7 – GTR82 remote connection diagram

1.5.4 Inside fuse and protecting value



1.5.5 Group connection

1. Every controller must have its own identified number to support software recognition. Go to System / Misc. page, and change its id number.
2. Group wiring :
The MTR-1 terminal pin 1 and pin 4 are the power supplied ports, so just one MTR-1 needs to be connected with pin 1,2,3,4, and others connect with pin 2, 3 only.

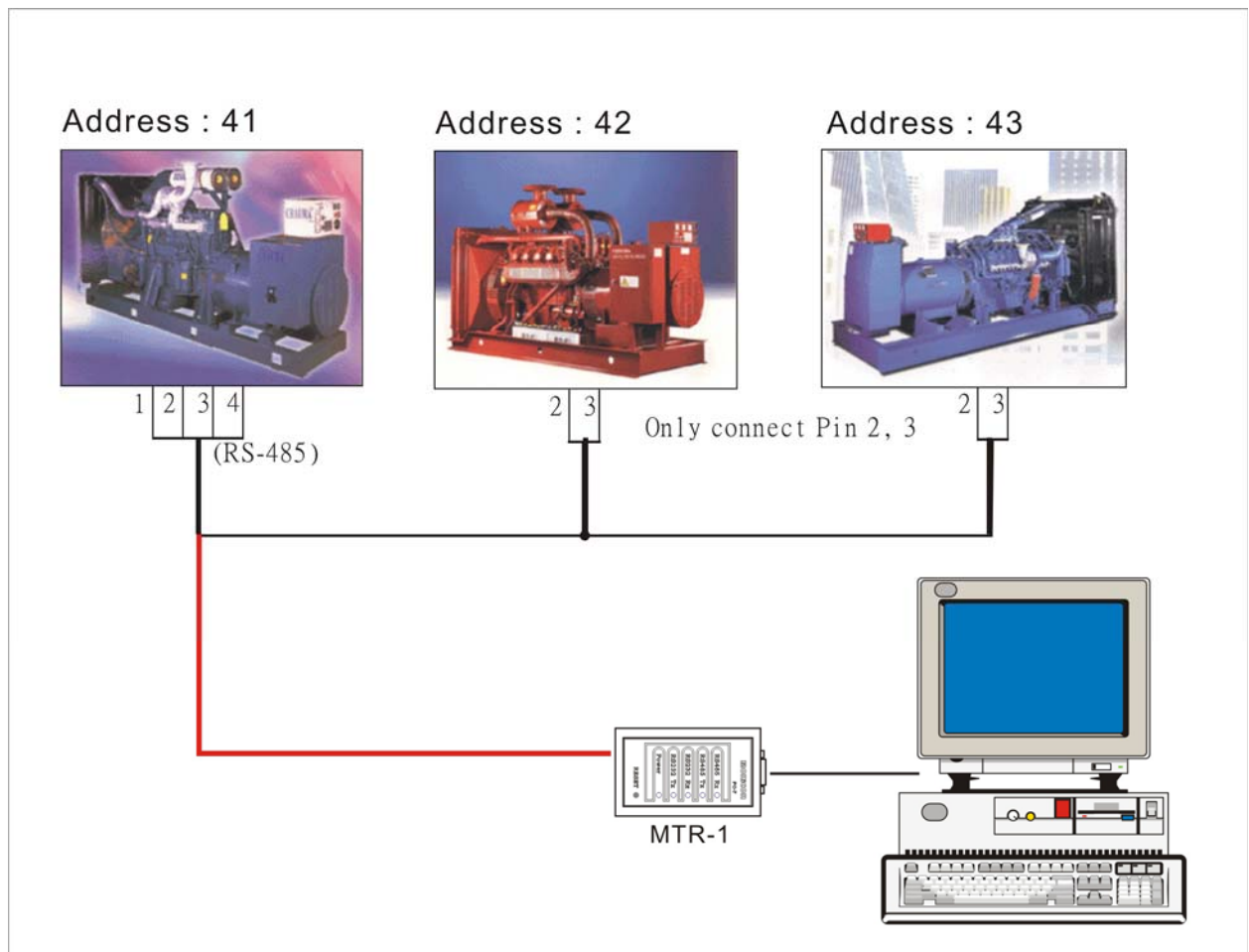


Figure 8 – Group connection diagram

Note: It is strong suggestion that using another power source to power the communication card (MTR-1), If the wire length over 25 meters. This prevents the MTR-1 go in an unpredictable condition by voltage drop.

2 Communication protocol for user monitoring (start)

2.1 Communication Interface

2.1.1 Connect with GTR82 via RS-485 interface

- Connection method1

Master device (RS-485) ⇔ GTR82 as slave device (RS485)

- Master device UART configuration

9600 bps, no parity, 9 data bits, 1 stop bits

The leading 8 bits information defines as “Address”, when the 9th bit sets to 1 (or logic high), and it defines as “Data” when the 9th bit sets to 0 (or logic low).

- Information transmitting format

The master device transmitting information form includes three parts that are **Address**, **Command** as well as **Data** in three bytes.

Address represents the GTR82's identified number.

Command represents with function group that master device invoke to be executed.

Data represents which exactly command that master device invoke to be executed.

- Encryption processing

Each byte of the transmitting information must be encrypted as follow; let's say FID, the factory ID number, is

0x6F.

| Data processing | Example |
|---|---------------------------------------|
| Address = Address XOR FID | Address = 0x41 XOR 0x6F = 0x2E |
| Command = Command XOR FID | Command = 0xC8 XOR 0x6F = 0xA7 |
| Data = Data XOR FID | Data = 0x05 XOR 0x6F = 0x6A |

For example, the master device transmits information to GTR82 controller via RS485 should be 0x2E then 0xA7 and then 0x6A as sequence.

■ Information receiving format

The master device receiving information form includes two parts **Echo** and **Check**.

Echo represents the information that GTR82 responds to the master device transmitting information.

Check is used for master device checks the accuracy of the receiving information.

■ Receiving information processing

| Data processing | Example |
|-------------------------------------|-------------------------------------|
| Echo = Echo XOR FID | Echo = 0x6F XOR 0x6F = 0x00 |
| Check = Check XOR FID | Check = 0x91 XOR 0x6F = 0xFE |

The master device receives information from GTR82 controller via RS485 should be 0x00 and then 0xFE.

2.1.2 Transmit information via MTR-1

■ Connection method 2

Master device (RS-232) ⇔ MTR-1 as interface (RS232 ↔ RS-485) ⇔ GTR82 controller as slave device (RS485)

■ Device port configuration

19200 bps, no parity, 8 data bits, 2 stop bits

■ Information transmitting format

The master device transmitting information form includes four parts that are **Start**, **Address**, **Command** as well as **Data** in seven bytes.

| | Transmitted information | | | | | | |
|---------|-------------------------|---------|---|---------|---|----------|---|
| Format | Start | Address | | Command | | Function | |
| Example | | 4 | 1 | C | 8 | 0 | 5 |

The start byte, '|' (0x7C in hexadecimal form), is the synchronous character of the MTR-1. The description of Address, Command and Data are the same as defined in section 2.1.1.

All transmitting information should be transfer from hexadecimal to two ASCII characters, for example, if the **Address** is 0x41, then the transmitting data is '4' '1', or 0x34 0x31 in hexadecimal form.

■ Encryption process

| Data processing | Example | Split into two ASCII characters |
|---|---------------------------------------|---------------------------------|
| Address = Address XOR FID | Address = 0x41 XOR 0x6F = 0x2E | 2E |
| Command = Command XOR FID | Command = 0xC8 XOR 0x6F = 0xA7 | A7 |
| Data = Data XOR FID | Data = 0x05 XOR 0x6F = 0x6A | 6A |

The master device transmits information to GTR82 controller via MTR-1 interface should be '|' '2' 'E' 'A' '7' '6' 'A' in character way, or 0x7C 0x32 0x69 0x65 0x67 0x66 0x65 in binary way.

■ Information receiving format

The format of receiving information form MTR-1 includes four bytes, and is combined with **Echo** and **Check** two parts. The descriptions of **Echo** and **Check** are the same as defined in section 2.1.1.

| | Received information | | | |
|---------|----------------------|---|-------|---|
| Format | Echo | | Check | |
| Example | 6 | F | 9 | 1 |

■ Receiving information processing

1. Transfer the two ASCII characters of the **Echo** part into one byte, for example '6' 'F' → 0x6F.
2. Transfer the two ASCII characters of the **Check** part to one byte, for example '9' '1' → 0x91.
3. XOR process, **Echo** = **Echo** XOR FID, **Check** = **Check** XOR FID.
4. Check the accuracy of the receiving information. The receiving information is correct, only when the value of the de-encrypted information is equal to 0xFE.

2.1.3 C8 command description

| Code | Description |
|------|--|
| 00 | Controller Type The readout value represents the type of the GTR controller. The value 0x80 represents the controller is GTR80, 0x82 represents the controller is GTR82, ... etc. |
| 01 | Current page of LCD |
| 02 | R-S voltage low byte |
| 03 | S-T voltage low byte |
| 04 | T-R voltage low byte |
| 05 | R-S voltage high byte |
| 06 | S-T voltage high byte |
| 07 | T-R voltage high byte |
| 08 | Integral of frequency |
| 09 | Decimal of frequency |
| 0A | R-N voltage |
| 0B | S-N voltage |
| 0C | T-N voltage |
| 0D | Power factor The value 102 represents that wiring is wrong. The value 101 represents that Power factor is lead. The value between 100 and 55 represents current power factor, and the power factor is value / 100. The value 55 represents power factor under 0.55. |
| 0E | Thousands number of the KW |
| 0F | Hundreds number of the KW |
| 10 | Tens number of the KW |
| 11 | Units number of the KW |
| 12 | Decimal point of the KW |
| 13 | Decimal of the KW |
| 14 | Hundred thousands number of the KWH |
| 15 | Ten thousands number of the KWH |
| 16 | Thousands number of the KWH |

| | |
|----|--|
| 17 | Hundreds number of the KWH |
| 18 | Tens number of the KWH |
| 19 | Units number of the KWH |
| 1A | |
| 1B | RPM high byte calculated from frequency |
| 1C | RPM low byte calculated from frequency |
| 1D | Battery voltage The battery voltage is calculated from the readout value divided 5. |
| 1E | |
| 1F | Digital output status Each digit represents an output relay status, 0: off; 1: on. Bit 0: Aux. output 0 Bit 1: Aux. output 1 Bit 2: Aux output 2 Bit 3: Trip relay Bit 4: Alarm output Bit 5: Aux. output 3 Bit 6: Motor output Bit 7: Valve output |
| 20 | |
| 21 | |
| 22 | Indicator status of group A Each bit represents a light on the penal, 0: off; 1: on. Bit 0: Run indicator Bit 1: Stop indicator Bit 2: Trip indicator Bit 3: Alarm indicator Bit 4: Over crank indicator Bit 5: High water temperature indicator Bit 6: Over speed indicator Bit 7: Low oil pressure indicator |
| 23 | |
| 24 | |
| 25 | |
| 26 | Second number of run hour |
| 27 | Minute number of run hour |
| 28 | Hour number of run hour |

| | |
|----|--|
| 29 | 100 hour number of run hour |
| 2A | R phase current low byte |
| 2B | S phase current low byte |
| 2C | T phase current low byte |
| 2D | R phase current high byte |
| 2E | S phase current high byte |
| 2F | T phase current high byte |
| 30 | Value of coolant temperature The value 0xFF (255) represents the coolant temperature sensor is open. The value 0xFE (254) represents the coolant temperature is over 120 °C. The value 0xFD (253) represents the coolant temperature is below 40 °C. The value 0xFC (252) represents the coolant temperature sensor is short. The other value represents current coolant temperature, for example, the readout value is 0x55 (85) that represents 85 °C. |
| 31 | Value of lubricant pressure The value 0xFF (255) represents the lubricant pressure sensor is open. The value 0xFE (254) represents the lubricant pressure is over 150 PSI. The value 0xFD (253) represents the lubricant pressure is 0 PSI. The value 0xFC (252) represents the lubricant pressure sensor is short. The other value represents current lubricant pressure, for example, the readout value 0x55 (85) represents 85 PSI. |
| 32 | Value of fuel level The value 0xFF (255) represents the fuel level sensor is open. The value 0xFE (254) represents the fuel level is full. The value 0xFD (253) represents the fuel level is empty. The value 0xFC (252) represents the fuel level sensor is short. The other value represent current coolant level, for example, the readout value is 0x55 (85) that represents 85 %. |
| 33 | Maximum page of LCD |
| 34 | Decimal of the KVA |
| 35 | Decimal point of the KVA |
| 36 | Units number of the KVA |

| | |
|----|--|
| 37 | Tens number of the KVA |
| 38 | Hundreds number of the KVA |
| 39 | Thousands number of the KVA |
| 3A | RPM low byte calculated by charger |
| 3B | RPM high byte calculated by charger |
| 3C | |
| 3D | |
| 3E | System information |
| 3F | Value of lubricant temperature The value 0xFF (255) represents the lubricant temperature sensor is open. The value 0xFE (254) represents the lubricant temperature is over 120 °C. The value 0xFD (253) represents the lubricant temperature is below 40 °C. The value 0xFC (252) represents the lubricant temperature sensor is short. The other value represents current lubricant temperature, for example, the value is 0x55 (85) that represents 85 °C. |
| 40 | Trip code |
| 41 | Alarm code |
| 42 | U-V voltage low byte |
| 43 | V-W voltage low byte |
| 44 | W-U voltage low byte |
| 45 | U-V voltage high byte |
| 46 | V-W voltage high byte |
| 47 | W-U voltage high byte |
| 48 | Remote run down-count counter |
| 49 | Remote run down-count aide counter |
| 4A | |
| 4B | |
| 4C | |
| 4D | |
| 4E | |
| 4F | |
| 50 | U-N voltage |
| 51 | V-N voltage |
| 52 | W-N voltage |

| | | | | |
|----|--|----------------|--------------------|---------------------|
| 53 | Ratio of AC voltage Mask readout value with binary value 11111000B and right shift 3 digits to get the voltage ratio index. Ratio index = readout value >> 3 | | | |
| | Ratio index | System voltage | Line voltage ratio | Phase voltage ratio |
| | 0 | 110V | 0.01 | 1 |
| | 1 | 120V | 0.01 | 1 |
| | 2 | 190V | 0.01 | 1 |
| | 3 | 208V | 0.01 | 1 |
| | 4 | 220V | 0.01 | 1 |
| | 5 | 380V | 0.01 | 1 |
| | 6 | 440V | 0.02 | 2 |
| | 7 | 480V | 0.02 | 2 |
| | 8 | 3300V | 0.1 | 10 |
| | 9 | 660V | 0.03 | 3 |
| 54 | Ratio of current transformer Mask readout value with binary value 11111000B and right shift 3 digits to get the current ratio index. Ratio index = readout value >> 3 | | | |

| | | | | |
|--|-------------|----------|----|----------|
| | Ratio index | CT ratio | | CT ratio |
| | 0 | 20:5 | 15 | 1000:5 |
| | 1 | 30:5 | 16 | 1500:5 |
| | 2 | 40:5 | 17 | 2000:5 |
| | 3 | 50:5 | 18 | 3000:5 |
| | 4 | 60:5 | 19 | 4000:5 |
| | 5 | 80:5 | 20 | 5000:5 |
| | 6 | 100:5 | 21 | 6000:5 |
| | 7 | 150:5 | 22 | 10:5 |
| | 8 | 200:5 | 23 | 15:5 |
| | 9 | 300:5 | 24 | 75:5 |
| | 10 | 400:5 | 25 | 250:5 |
| | 11 | 500:5 | 26 | 750:5 |
| | 12 | 600:5 | 27 | 1200:5 |
| | 13 | 800:5 | 28 | 2500:5 |
| | 14 | 900:5 | | |

2.1.4 Example for AC line voltage, phase voltage, and current readout

■ R-S voltage readout

- Let's say the GTR82 controller address is 0x41, the factory ID number (FID) is 0x6F, the RS voltage is 220V and the system voltage is 220V.
- Get the voltage ratio:
 - Master device should send 0x41 0xC8 0x53 as an original command and data.
 - After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x3C.
 - Receiving information:
 - Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 3 C". The receive Echo and Check are "4F91". The receiving information is "20FE" after encrypt with factory ID number (FID, 0x6F).
 - Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x3C. The receive Echo and Check are 0x4F 0x91. The receiving information is 0x20 0xFE after encrypt with factory ID number, FID 0x6F.
 - The readout of voltage ratio is 0x20 (32).
 - Mask the Echo value with binary value 11111000B and right shift three digit, and the answer is 0x04.
 - Check the look up table and get the ratio 0.01 and the system volt is 220V.
- Get the R-S voltage low byte:
 - Master device should send 0x41 0xC8 0x02 as an original command and data.
 - After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x6D.
 - Receiving information:
 - Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 6 D". The receive Echo and Check are "9F91". The receiving information is "F0FE" after encrypt with factory ID number, FID 0x6F.
 - Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x6D. The receive Echo and Check are 0x9F 0x91. The receiving information is 0xF0 0xFE

- after encrypt with factory ID number, FID 0x6F.
- d. The readout of R-S voltage low byte is 0xF0 (240).
4. Get R-S voltage high byte:
 - a. Master device should send 0x41 0xC8 0x05 as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x6A.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 6 A". The receive Echo and Check are "3A91". The receiving information is "55FE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x6A. The receive Echo and Check are 0x3A 0x91. The receiving information is 0x55 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of R-S voltage low byte is 0x55 (85).
 5. Combine the voltage high and low byte to get the RS true value.
 - a. High byte contribute value is $256 * 85 = 21760$.
 - b. Low byte contribute value is 240.
 - c. The voltage ratio is 0.01.
 - d. So the answer is $(21760 + 240) * 0.01 = 220 \text{ V}$
- R-N voltage readout
1. Let's say the GTR82 controller address is 0x41, the factory ID number, FID is 0x6F, the RN voltage is 127V and the voltage ratio is 220V.
 2. Get the voltage ratio:
 - a. Master device should send 0x41 0xC8 0x53 as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x3C.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR80: The transmitting information should be "| 2 E A 7 3 C". The receive Echo and Check are "4F91". The receiving information is "20FE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR80: The command transmitting information should be 0x2E 0xA7 0x3C. The receive Echo and Check are 0x4F 0x91. The receiving information is 0x20 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of voltage ratio is 0x20 (32).
 - e. Mask the Echo value with binary value 11111000B and right shift three digit, and the answer is 0x04.
 - f. Check the look up table and get the ratio 1 and the system volt is 220V.
 3. Get the R-N voltage:
 - a. Master device should send 0x41 0xC8 0x0A as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x65.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 6 5". The receive Echo and Check are "1091". The receiving information is "7FFE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x65. The receive Echo and Check are 0x10 0x91. The receiving information is 0x7F 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of R-N voltage is 0x7F (127)
 4. The answer is $127 * 1 = 127\text{V}$

■ R-phase current readout

1. Let's say the GTR82 controller address is 0x41, the factory ID number, FID is 0x6F, the R-phase current is 365A and the current ratio is 400:5.
2. Get the current ratio:
 - a. Master device should send 0x41 0xC8 0x54 as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x3B.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 3 B". The receive Echo and Check are "3F91". The receiving information is "50FE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x3B. The receive Echo and Check are 0x3F 0x91. The receiving information is 0x50 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of current ratio is 0x50 (80).
 - e. Mask the Echo value with binary value 11111000B and right shift three digit, and the answer is 0x0A.
 - f. Check the look up table and get the ratio 400:5, and the full scale is 400.
3. Get the R-phase current low byte:
 - a. Master device should send 0x41 0xC8 0x2A as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x45.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 4 5". The receive Echo and Check are "2D91". The receiving information is "42FE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x45. The receive Echo and Check are 0x2D 0x91. The receiving information is 0x42 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of R-phase current low byte is 0x42 (66).
4. Get the R-phase current high byte:
 - a. Master device should send 0x41 0xC8 0x2D as an original command and data.
 - b. After encryption factory ID number 0x6F, the command should like 0x2E 0xA7 0x42.
 - c. Receiving information:
 - i. Master device via MTR-1 connect to GTR82: The transmitting information should be "| 2 E A 7 4 2". The receive Echo and Check are "6191". The receiving information is "0EFE" after encrypt with factory ID number, FID 0x6F.
 - ii. Master device direct connect to GTR82: The command transmitting information should be 0x2E 0xA7 0x42. The receive Echo and Check are 0x61 0x91. The receiving information is 0x0E 0xFE after encrypt with factory ID number, FID 0x6F.
 - d. The readout of R-phase current high byte is 0x0E (14).
5. Calculate the R-phase current by the following procedure:

```

if (full scale <= 80)
{
    R-phase current = (256 * current-high-byte + current-low-byte) / 100;
    Current display format is XX.X A
}
else if (full scale <= 200)
{
    R-phase current = (256 * current-high-byte + current-low-byte) / 100;
    Current display format is XXX.X A
}

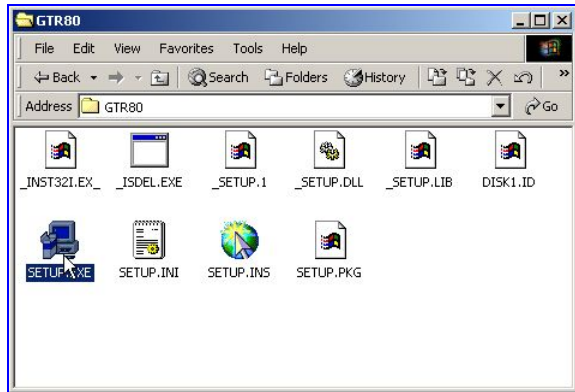
```

```
else
{
    R-phase current = (256 * current-high-byte + current-low-byte) / 10;
    Current display format is XXXX A
}
So, the answer is  $(256 * 14 + 66) / 10 = 3650 / 10 = 365$  A. (end)
```

3 Software manual

3.1 GTR82 software installation

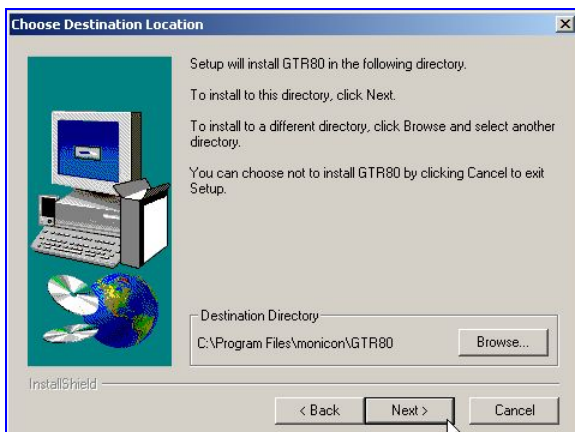
1. **Step 1:** open the GTR80 installation folder and double click the file "setup.exe". The setup wizard will guide you to finish the whole installing process.



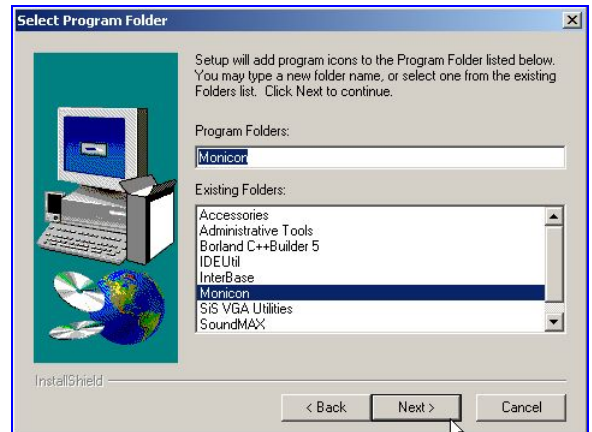
2. **Step 2:** welcome screen.



3. **Step 3:** choose the destination folder.



4. **Step 4:**



5. **Step 5:** restart computer.

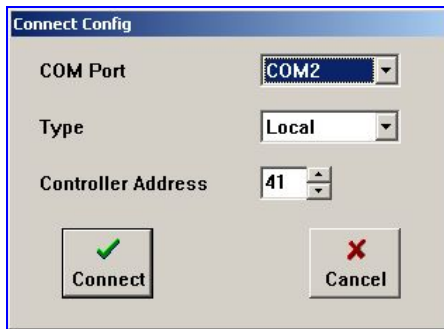


3.2 GTR82 software description

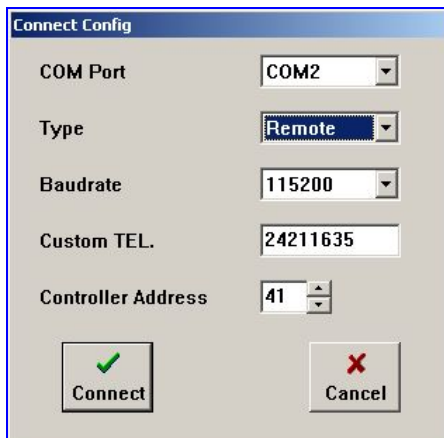
3.2.1 Button

■ Connection

The connection config window will display after clicked this button. User need to be set comport, connection method and controller ID. Then click “Connect” button makes the communication working between controller and computer.



Local connection setting window



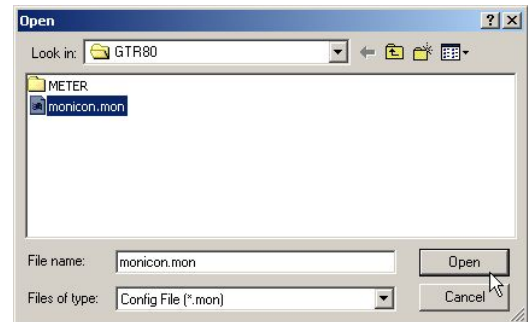
Remote connection window

■ Disconnection

Click this button cuts off connection between computer & controller

■ Open file

Open an existed configuration file of GTR82. It is convenience for configuring the GTR82 controller with the same requirement.



■ Save file

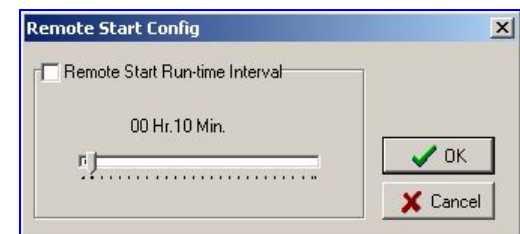
Save the configuration of GTR82 in to a file as a record or a configuration library.

■ Remote start

When the connection between GTR82 and software is setup, User can remote start engine by two ways:

1. Enable the “Remote start run-time interval” item then click OK. The engine will be started at next second, and will be stopped until the timer is expired, or click the remote stop button.
2. Click OK directly, the engine will be started and will be stopped if the communication is failed or click the remote stop button.

Note: Communication may fail by many reasons, so it is strong suggestion that using method 1 to remote start the engine.



■ Remote stop

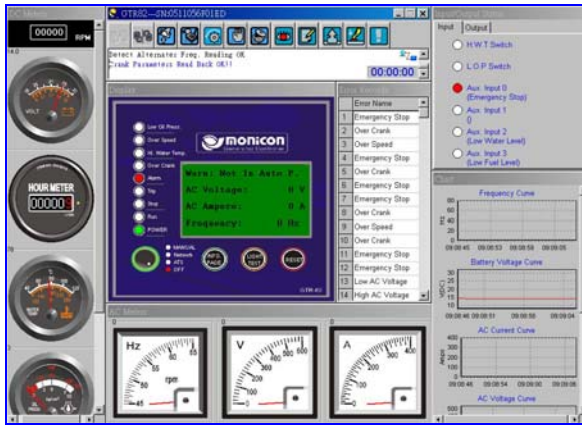
Click this button shuts down the running engine that by network remote start.

■ Reset

Click this button clears the fault indicate and set the whole system in a normal status.

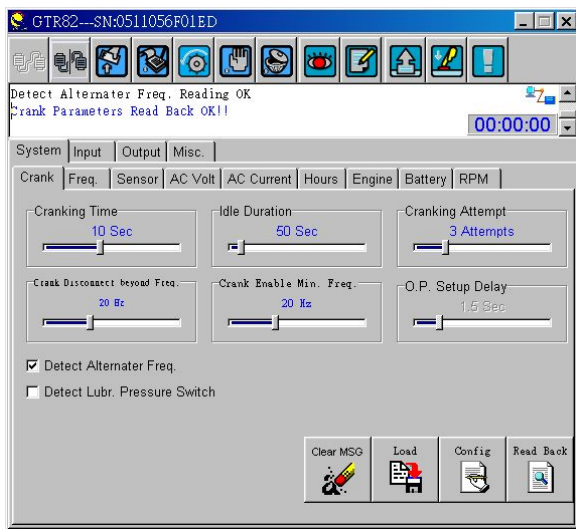
■ Panel

Click this button shows the controller’s panel and all real time information.



■ Setting

Click this button shows the configuration screen.



■ Read all parameters

Click this button, all configuration settings will be

read from the GTR82 controller.

■ Set all parameters

Click this button, all configuration settings will be written into the GTR82 controller.

■ About

Click this button shows the information of the Monicon instruments Co., Ltd. and the version of the GTR82 software.

■ Read parameters

Click this button reads all the parameters in the current page that user selects.

■ Set parameters

Click this button configures all the parameters in the current page that user selects.

■ Refresh

After configuring settings to the GTR82 controller, the settings are in the un-working memory. Click this button lets the GTR82 controller to refresh its settings into the running procedure.

■ Clear MSG

Click this button clears the texts in the message box.



3.3 Parameters description

3.3.1 System page

■ Crank page

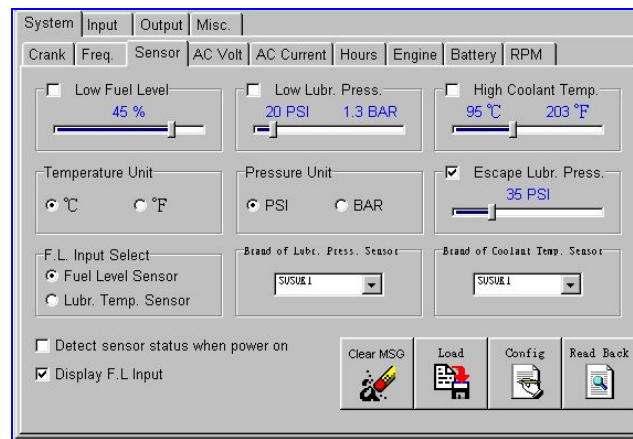
| Item | Name | Default | Range | Description |
|------|--|------------|----------------------|---|
| 1 | Cranking time | 10 Sec. | 3 ~ 20 Sec. | Set the maximum limitation of the cranking time. |
| 2 | Idle duration | 10 Sec. | 5 ~ 600 Sec. | The interval of the idle running. |
| 3 | Crank disconnect beyond frequency | 20 Hz | 15 ~ 30 Hz | When frequency goes above this setting, the starter motor will escape. |
| 4 | Crank enable minimum frequency | 20 Hz | 15 ~ 30 Hz | When frequency is below this setting the starter motor will be activated during cranking interval. |
| 5 | Crank attempt | 3 | 1 ~ 10 | Total cranking attempts. |
| 6 | Detect alternate frequency | Checked | Checked / Un-checked | Checked means enable this function. Controller escapes starter motor refers to frequency value. |
| 7 | Detect Lubricant pressures sw. | Un-checked | Checked / Un-checked | Controller escapes starter motor refers to lubricant pressure built up. |
| 8 | Lubricant pressures sw. escape starter | 1.5 Sec. | 0.5 ~ 6.25 Sec. | If the system's setting "Detect Lubricant Pressure sw." is enabled, when oil pressure switch is activated and the active period is longer than this setting, the controller will escape the starter motor during crank interval. This setting is nothing to do with low oil pressure delay. |

■ Freq. page

| Item | Name | Default | Range | Description |
|-----------------------|-------------|---------|----------------------|-------------------------------------|
| Over frequency | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Action mode | Stop | Un-changeable | |
| 3 | Setting | 66 Hz | 60 ~ 72 Hz | 60 Hz system |
| | | 55 Hz | 50 ~ 60 Hz | 50 Hz system |

| Item | Name | Default | Range | Description |
|---------------------------------|------------------|----------|----------------------|---|
| 4 | Timer | 2 sec. | 1 ~ 10 Sec. | |
| Low frequency | | | | |
| 5 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 6 | Action mode | Indicate | | There are four kind action mode can be selected. Stop [*] , Trip [†] , Alarm [‡] , Indicate [§] |
| 7 | Setting | 54 Hz | 48 ~ 59 Hz | 60 Hz system |
| | | 45 Hz | 40 ~ 50 Hz | 50 Hz system |
| 8 | Timer | 6 Sec. | 1 ~ 10 Sec. | |
| Minimum detect frequency | | | | |
| 9 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 10 | Setting | 30 Hz | 10 ~ 45 Hz | Low frequency protection will be disabled if frequency is under this setting. |
| 11 | System frequency | 60 Hz | 50 / 60 Hz | Rated frequency of the generator system. |

■ Sensor page



| Item | Name | Default | Range | Description |
|---------------------------------|------------------|------------|----------------------|--|
| Low fuel level | | | | |
| 1 | Checked box | Un-Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Setting | 20 % | 6 ~ 55 % | Controller gives an alarm signal when this function is enabled and the fuel level is under this setting. |
| Low lubricant pressure | | | | |
| 3 | Checked box | Un-Checked | Checked / Un-checked | Checked means enable this function. |
| 4 | Setting | 20 PSI | 15 ~ 60 PSI | Controller gives an alarm signal when this function is enabled and the value of the lubricant pressure sensor is under this setting. |
| High coolant temperature | | | | |
| 5 | Checked box | Un-Checked | Checked / Un-checked | Checked means enable this function. |
| 6 | Setting | 95 °C | 85 ~ 110 °C | Controller gives an alarm signal when this function is enabled and the value of the coolant temperature sensor is over this setting. |
| 7 | Temperature unit | °C | °C / °F | The unit of the temperature on the LCD display. |
| 8 | Pressure unit | PSI | PSI / BAR | The unit of the pressure on the LCD display. |

* Stop means controller shuts down the engine when the function is activated.

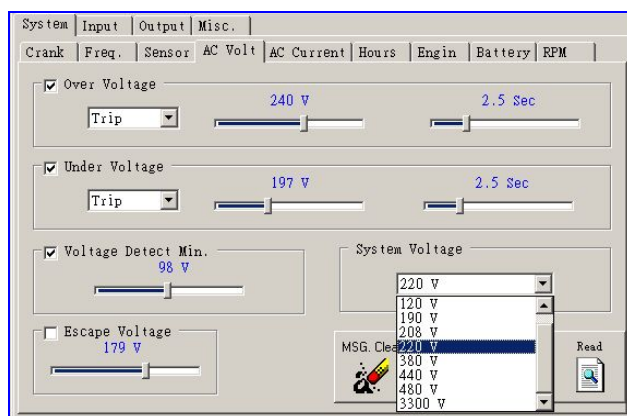
† Trip means controller gives an open signal via Trip output (Trip output is normal close relay) when the function is activated.

‡ Alarm means controller gives a warning signal via Alarm output when the function is activated.

§ Indicate means controller indicates the fault signal via the indicator of the panel when the function is activated.

| Item | Name | Default | Range | Description |
|----------------------------------|-------------------------------------|-------------------|---|--|
| Escape lubricant pressure | | | | |
| 9 | Checked box | Un-Checked | Checked / Un-checked | Checked means enable this function. |
| 10 | Setting | 35 PSI | 25 ~ 65 PSI | Controller escapes the starter motor when the value of the lubricant pressure sensor is greater than this setting. |
| 11 | F.L. input select | Fuel level sensor | Fuel level sensor | Use fuel level sensor as the F.L. input. |
| | | | Lubricant temp. sensor | Use lubricant temperature sensor as the F.L. input. |
| 12 | Brand of lubricant pressure sensor | SUSUKI | SUSUKI PRO VDO 10 BAR VDO 5 BAR SCD | GTR82 supports five brand of the lubricant pressure sensor. |
| 13 | Brand of coolant temperature sensor | SUSUKI | SUSUKI PRO VDO SCD | GTR82 supports four brand of the coolant temperature sensor. |
| 14 | Detect sensor status when power on | Checked | Checked / Un-checked | Checked means enable this function. |
| 15 | Display F.L. input | Checked | Checked / Un-checked | Checked means display fuel level value or lubricant temperature depends on selecting. |

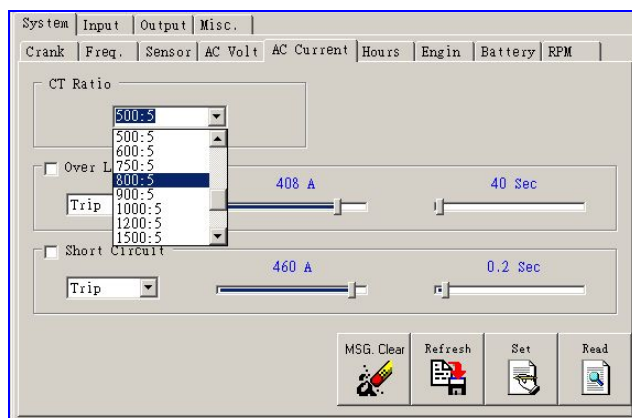
■ AC volt page



| Item | Name | Default | Range | Description |
|----------|-------------|----------|----------------------|---|
| 3 | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Action mode | Trip | | Refer to the description in *, †, ‡, §. |
| 3 | Setting | 121 V | 110 ~ 128 V | AC 110 V system |
| | | 131 V | 119 ~ 138 V | AC 120 V system |
| | | 207 V | 190 ~ 219 V | AC 190 V system |
| | | 228 V | 207 ~ 240 V | AC 208 V system |
| | | 242 V | 219 ~ 254 V | AC 220 V system |
| | | 416 V | 378 ~ 439 V | AC 380 V system |
| | | 484 V | 439 ~ 512 V | AC 440 V system |
| | | 525 V | 477 ~ 553 V | AC 480 V system |
| | | 3632 V | 2197 ~ 3823 V | AC 3300 V system |
| 4 | Timer | 726 V | 659 ~ 762 V | AC 660 V system |
| | | 2.5 Sec. | 0.25 ~ 10 Sec. | |

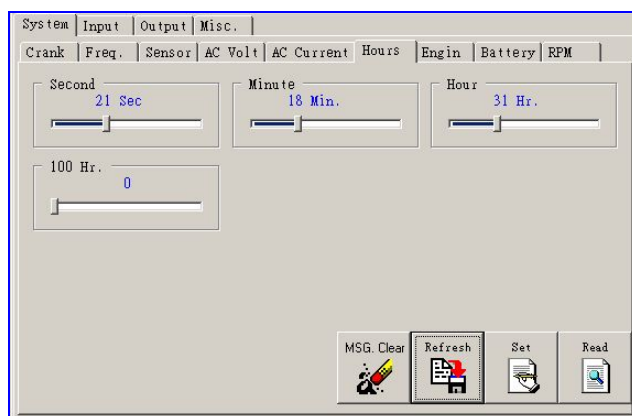
| Item | Name | Default | Range | Description | | |
|------------------------|----------------|-------------|----------------------|--|---|------------------|
| Under voltage | | | | | | |
| 5 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. | | |
| 6 | Action mode | Trip | | Refer to the description in *, †, ‡, §. | | |
| 7 | Setting | 98 V | 91 ~ 110 V | AC 110 V system | | |
| | | 107 V | 100 ~ 119 V | AC 120 V system | | |
| | | 171 V | 159 ~ 190 V | AC 190V system | | |
| | | 186 V | 174 ~ 207 V | AC 208 V system | | |
| | | 197 V | 185 ~ 219 V | AC 220 V system | | |
| | | 340 V | 318 ~ 378 V | AC 380 V system | | |
| | | 394 V | 370 ~ 439 V | AC 440 V system | | |
| | | 432 V | 401 ~ 477 V | AC 480 V system | | |
| | | 2958 V | 1851 ~ 3304 V | AC 3300 V system | | |
| | 591 V | 555 ~ 659 V | AC 660 V system | | | |
| 8 | Timer | 2.5 Sec. | 0.25 ~ 10 Sec. | | | |
| Voltage detect minimum | | | | | | |
| 9 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. | | |
| 10 | Setting | 34 V | 25 ~ 72 V | AC 110 V system | Under voltage protection is disabled when the value of the AC voltage is under this setting. | |
| | | 39 V | 29 ~ 79 V | AC 120 V system | | |
| | | 62 V | 46 ~ 124 V | AC 190V system | | |
| | | 62 V | 51 ~ 136 V | AC 208 V system | | |
| | | 72 V | 53 ~ 145 V | AC 220 V system | | |
| | | 124 V | 93 ~ 252 V | AC 380 V system | | |
| | | 145 V | 107 ~ 290 V | AC 440 V system | | |
| | | 159 V | 117 ~ 318 V | AC 480 V system | | |
| | | 1089 V | 813 ~ 2197 V | AC 3300 V system | | |
| | | 217 V | 160 ~ 435 V | AC 660 V system | | |
| 11 | System voltage | 220 V | 110 V | Connect directly. | | |
| | | | 120 V | | | |
| | | | 190 V | | | |
| | | | 208 V | | | |
| | | | 220 V | | | |
| | | | 380 V | | | |
| | | | 440 V | Connect with transformer (440V / 220 V) | | |
| | | | 480 V | Connect with transformer (480V / 240 V) | | |
| | | | 3300 V | Connect with transformer (3300V / 330 V) | | |
| | | | 660 V | Connect with transformer (660V / 330 V) | | |
| Escape voltage | | | | | | |
| 12 | Checked box | Un-checked | Checked / Un-checked | Checked means enable this function. | | |
| 13 | Setting | 93 V | 53 ~ 108 V | AC 110 V system | Controller escapes the starter motor when the value of AC voltage is greater than this setting if the escape voltage function is enabled. | |
| | | | 100 V | 58 ~ 119 V | | AC 120 V system |
| | | | 160 V | 93 ~ 188 V | | AC 190V system |
| | | | 176 V | 103 ~ 207 V | | AC 208 V system |
| | | | 186 V | 108 ~ 219 V | | AC 220 V system |
| | | | 321 V | 188 ~ 378 V | | AC 380 V system |
| | | | 373 V | 217 ~ 439 V | | AC 440 V system |
| | | | 404 V | 238 ~ 477 V | | AC 480 V system |
| | | | 2802 V | 1643 ~3286 V | | AC 3300 V system |
| | | | 560 V | 326 ~ 659 V | | AC 660 V system |

■ AC current page



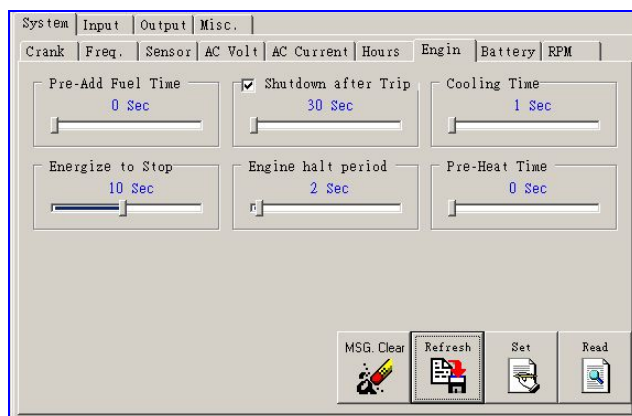
| Item | Name | Default | Range | Description |
|----------------------|-------------|----------|-----------------------------------|---|
| 1 | CT ratio | 400:5 | 10:5 ~ 6000:5 | Select system current transformer ratio. |
| Over load | | | | |
| 2 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 3 | Action mode | Trip | Stop Trip Alarm Indicate | |
| 4 | Setting | 348 A | 1 ~ 400 A | The value depends on CT ratio which user selects. |
| 5 | Timer | 40 Sec. | 10 ~ 2550 Sec. | |
| Short circuit | | | | |
| 6 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 7 | Action mode | Trip | Stop Trip Alarm Indicate | |
| 8 | Setting | 376 A | 1 ~ 400 A | The value depends on CT ratio which user selects. |
| 9 | Timer | 0.2 Sec. | 0.1 ~ 2 Sec. | |

■ Hours page



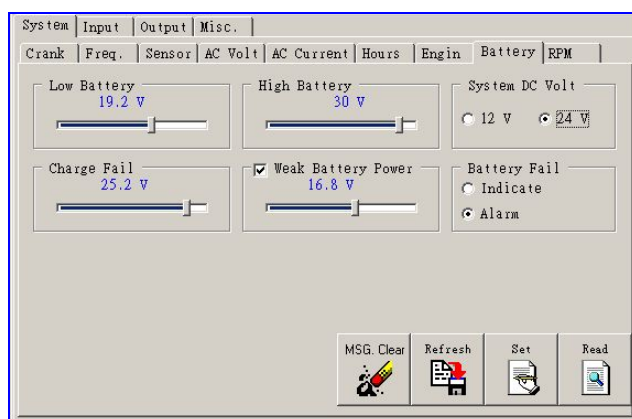
| Item | Name | Default | Range | Description |
|------|----------|---------|--------|-------------|
| 1 | Second | 0 | 0 ~ 59 | |
| 2 | Minute | 0 | 0 ~ 59 | |
| 3 | Hour | 0 | 0 ~ 99 | |
| 4 | 100 Hour | 0 | 0 ~ 99 | |

■ Engine page



| Item | Name | Default | Range | Description |
|----------------------------|--------------------|---------|----------------------|--|
| 1 | Pre-add fuel time | 0 Sec. | 0 ~ 10 Sec. | The interval of pre-add fuel before start engine. |
| 2 | Engine halt period | 2 Sec. | 1 ~ 30 Sec. | Engine will be halt a period of time after system shut down by fault occurred. |
| 3 | Cooling time | 1 Sec. | 1 ~ 240 Sec. | After normal shut down the engine, the cooling procedure will be activated. Cooling time will be no used in fault shut down or by manual switch off. |
| 4 | Energies to stop | 10 Sec. | 1 ~ 20 Sec. | The timer is setting how long the fuel solenoid should be energized to stop the engine completely |
| 5 | Pre-heat timer | 0 Sec. | 0 ~ 60 Sec. | The Pre-Heat procedure will be activated and the AUX. relay outputs if signet. |
| Shutdown After Trip | | | | |
| 6 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 7 | Timer | 30 Sec. | 30 ~ 900 Sec. | When trip activated the Run light will flash and trip relay energized, the control will shut down the engine if fault not clear before the setting time is up. |

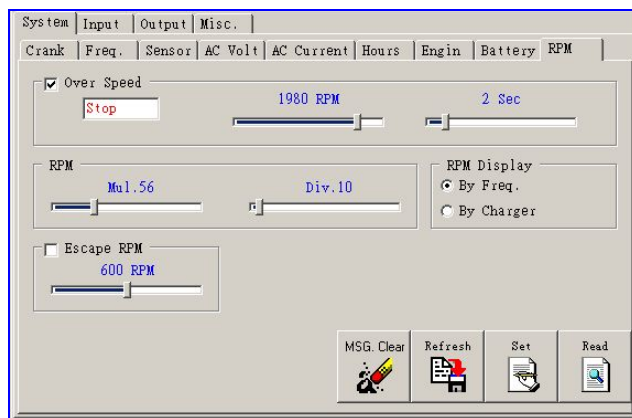
■ Battery page



| Item | Name | Default | Range | Description |
|---------------------------|----------------------------|----------|----------------------|--|
| 1 | Low battery volt setting | 19.2 V | 7.6 ~ 26 V | DC volts under this setting value will cause warning or alarm depends on setting. |
| 2 | High Battery Volt. Setting | 30 V | 12 ~ 32 V | DC volts above this setting value will cause warning or alarm depends on setting. |
| 3 | System DC Volt. | 24 V | 12V / 24V | |
| 4 | Charge Fail | 25.2 DCV | 11 ~ 26 V | Sets the minimum charger output voltage while engine running. The action mode is Indicate. |
| Week battery power | | | | |
| 5 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |

| Item | Name | Default | Range | Description |
|------|--------------|---------|----------------|---|
| 6 | Setting | 16.8 V | 7.6 V ~ 23 V | During the crank interval, if DC voltage drop below this setting exceeds cranking time minus one second then GTR82 will shut down the engine and display “DC weak power”. |
| 7 | Battery fail | Alarm | Indicate Alarm | Controller gives an alarm or indicate signal when the low battery or high battery occurred. |

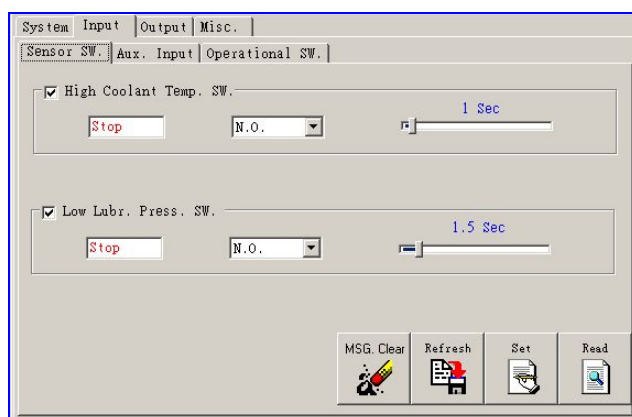
■ RPM page



| Item | Name | Default | Range | Description |
|------------|-----------------|----------|-----------------------|---|
| Over Speed | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Action mode | Stop | Un-changeable | |
| 3 | Setting | 1980 RPM | 1350 ~ 2100 RPM | Over speed detecting method is sensed alternator charger RPM. IF over this setting then will cause engine stop. |
| 4 | Timer | 2 Sec. | 1 ~ 10 Sec. | |
| RPM ratio | | | | |
| 5 | Multiple factor | 56 | 1 ~ 200 | The ratio of rotation of main frame versus alternator chargers' pulley. |
| 6 | Divider factor | 10 | 1 ~ 200 | |
| Escape RPM | | | | |
| 7 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 8 | Setting | 600 RPM | 400 ~ 1000 RPM | Controller escapes the starter motor when engine speed is greater this setting. |
| 9 | RPM display | By Freq. | By Freq. / By Charger | The engine speed can be calculated by the AC frequency or by the alternator charger frequency depends on setting. |

3.3.2 Input page

■ Sensor switch page



| Item | Name | Default | Range | Description |
|--|-------------|----------|----------------------|--|
| High coolant temperature switch | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Action mode | Stop | Un-changeable | |
| 3 | Type | N.O. | N.O. N.C. | N.O. : This switch returns a closed signal during high water temperature conditions, once the engine water temperature is cool down the switch will open. N.C. : This switch returns an open signal during high water temperature conditions, once the engine water temperature is cool down the switch will close. |
| 4 | Timer | 1 Sec. | 0.5 ~ 10 Sec. | |
| Low lubricant pressure switch | | | | |
| 5 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 6 | Action mode | Stop | Un-changeable | |
| 7 | Type | N.O. | N.O. N.C. | N.O. : This switch returns a closed signal during low oil pressure conditions, once oil pressure is established the switch will open. N.C. : This switch returns an open signal during low oil pressure conditions, once oil pressure is established the switch will close. |
| 8 | Timer | 1.5 Sec. | 0.125 ~ 12.5 Sec. | |

■ Aux. input page

| Item | Name | Default | Range | Description |
|--------------------------|-------------|---------|----------------------|-------------------------------------|
| Auxiliary input 0 | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |

| Item | Name | Default | Range | Description |
|--------------------------|---------------|-----------------|----------------------|---|
| 2 | Function name | Emergency stop | See description | GTR82 supports the following function input as auxiliary input 0: Emergency stop, Low Battery Volt, High Fuel Level, Pre-Alarm, Charge fail, Over Load, Low Water Temp., and Spare. The function name Emergency stop is the special function for the auxiliary input 0. Controller shuts down the engine immediately when the Emergency stop switch is activated. |
| 3 | Action mode | Stop | | Refer to the description in *, †, ‡, §. When function name, Emergency stop, is selected, the action mode is set as Stop and is un-changeable. |
| 4 | Type | N.C. | N.C. N.O. | |
| 5 | Timer | 0.2 Sec. | 0.1 ~ 10 Sec | |
| Auxiliary input 1 | | | | |
| 6 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 7 | Function name | Battle switch | See description | GTR82 supports the following function input as auxiliary input 1: Battle switch, Low Battery Volt, High Fuel Level, Pre-Alarm, Charge fail, Over Load, Low Water Temp., and Spare. The function name battle switch is the special function for the auxiliary input 1. Controller bypassed the fault signal except the emergency stop and over speed when the battle switch input is activated and function name is selected. |
| 8 | Action mode | Stop | | Refer to the description in *, †, ‡, §. When function name battle switch is selected, the action mode is un-changeable. |
| 9 | Type | N.O. | N.O. N.C. | |
| 10 | Timer | 1 Sec. | 0.25 ~ 5 Sec | |
| Auxiliary input 2 | | | | |
| 11 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 12 | Function name | Low water level | See description | GTR82 supports the following function input as auxiliary input 2: Low water level, Low Battery Volt, High Fuel Level, Pre-Alarm, Charge fail, Over Load, Low Water Temp., and Spare. |
| 13 | Action mode | Stop | | Refer to the description in *, †, ‡, §. |
| 14 | Type | N.O. | N.O. N.C. | |
| 15 | Timer | 5 Sec. | 0.5 ~ 10 Sec | |
| Auxiliary input 3 | | | | |
| 16 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 17 | Function name | Low fuel level | See description | GTR82 supports the following function input as auxiliary input 3: Low fuel level, Low Battery Volt, High Fuel Level, Pre-Alarm, Charge fail, Over Load, Low Water Temp., and Spare. |
| 18 | Action mode | Stop | | Refer to the description in *, †, ‡, §. |
| 19 | Type | N.O. | N.O. N.C. | |
| 20 | Timer | 5 Sec. | 0.5 ~ 10 Sec | |

■ Operational switch page

| Item | Name | Default | Range | Description |
|----------------------|-------------|-----------|----------------------|-------------------------------------|
| ATS switch | | | | |
| 1 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 2 | Timer | 1 Sec. | 0.25 ~ 63.75 Sec. | |
| Manual switch | | | | |
| 3 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 4 | Timer | 1 Sec. | 0.25 ~ 5 Sec. | |
| Reset switch | | | | |
| 5 | Checked box | Checked | Checked / Un-checked | Checked means enable this function. |
| 6 | Timer | 0.25 Sec. | 0.25 ~ 2.5 Sec. | |

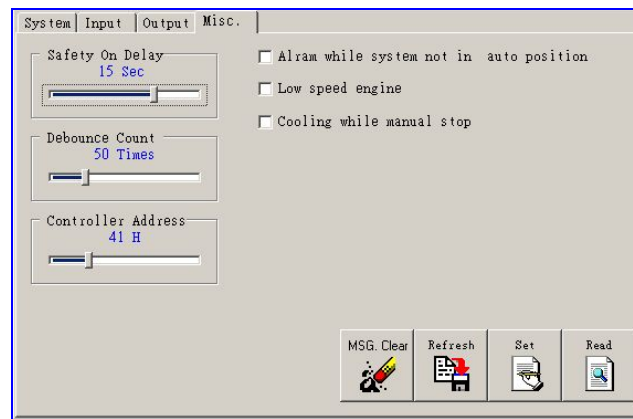
3.3.3 Output page

| Item | Name | Default | Range | Description |
|------|---------------|-------------------|-----------------|--|
| 1 | Aux. output 0 | Error occur | See description | GTR82 supports the following function output as auxiliary output: 1. Error Occur, 2. Standby, 3. Pre-heat, 4. Start Period, 5. Start Interval, 6. Run, 7. Stop, 8. Engine Halt, 9. Generator Working, 10. Reset Activate, 11. System Trip, 12. System Alarm, 13. Fire Charger, 14. High Coolant Temp. Value, 15. Low Fuel Level Value, 16. Low Lube Press. Value, 17. Under Frequency Active, 18. High Voltage Active, 19. Under Voltage Active, 20. Over Load Active, 21. Short Circuit Active, 22. Error Occur (B), 23. Reserve 2, 24. Spare, 25. Engine |
| 2 | Aux. output 1 | Pre-heat duration | See description | |
| 3 | Aux. output 2 | Energized to stop | See description | |

| Item | Name | Default | Range | Description |
|---------------------------------------|---------------------------|--------------|--|---|
| 4 | Aux. output 3 | Fire changer | See description | Running, 26. Low Water Level Active, 27. Low Bat. Volt Active, 28. Low Fuel Level Active, 29. Over Crank, 30. High Coolant Temp. Active, 31. Over Speed Active, 32. Low Lube Press. Active, 33. Emergency Stop Active, 34. Not Auto Position, 35. Manual Start, 36. Auto Start, 37. Remote Position, 38. Reserve 3, 39. Reserve 4 |
| 5 | Trip output | System trip | See description | |
| Auxiliary output function description | | | | |
| Item | Function name | | Description | |
| 1 | Error Occur | | An aux. output relay will be energized when engine stop by fault occurred. | |
| 2 | Standby | | When system is under standby status, the aux. output relay energized and will be de-energized when escape standby mode. | |
| 3 | Pre-heat | | An aux. output relay will be energized during the pre-heat procedure. | |
| 4 | Start Period | | An aux. output relay will be energized during the starter motor is activated. | |
| 5 | Start Interval | | An aux. output relay will be energized between the periods of two continuous cranking attempts. The time period is decided by the setting of the Energies to stop. | |
| 6 | Run | | An aux. output relay will be energized during the system is in running mode. | |
| 7 | Stop | | An aux. output relay will be energized when accepts the stop command or in start interval mode. The time period is decided by the setting of the Energies to stop. | |
| 8 | Engine Halt | | An aux. output relay will be energized during the engine halt mode. The time period is decided by the setting of Engine halt. | |
| 9 | Generator Working | | | |
| 10 | Reset Activate | | An aux. output relay will be energized while the reset button is pressed. | |
| 11 | System Trip | | An aux. output relay will be energized during system in the trip mode. | |
| 12 | System Alarm | | An aux. output relay will be energized during system in the alarm mode. | |
| 13 | Fire Charger | | An aux. output relay will be energized to fire the charger. The time period of the output signal is from start command accepts to the safety on timer expired. | |
| 14 | High Coolant Temp. Value | | An aux. output relay will be energized when the vale of the coolant temperature sensor is greater than the setting of the high coolant temperature. | |
| 15 | Low Fuel Level Value | | An aux. output relay will be energized when the vale of the fuel level sensor is less than the setting of the low fuel level. | |
| 16 | Low Lube Press. Value | | An aux. output relay will be energized when the vale of the lubricant pressure sensor is less than the setting of the low lubricant pressure. | |
| 17 | Under Frequency Active | | An aux. output relay will be energized when under frequency is occurred. | |
| 18 | High Voltage Active | | An aux. output relay will be energized when high voltage is occurred. | |
| 19 | Under Voltage Active | | An aux. output relay will be energized when under voltage is occurred. | |
| 20 | Over Load Active | | An aux. output relay will be energized when over load is occurred. | |
| 21 | Short Circuit Active | | An aux. output relay will be energized when short circuit is occurred. | |
| 22 | Error Occur (B) | | It is the same function of Error Occur but reverse action. | |
| 23 | Reserve 1 | | Reserve for the function extension in the future. | |
| 24 | | | | |
| 25 | Engine Running | | | |
| 26 | Aux. In 2 Active | | An aux. output relay will be energized when the auxiliary input 2 activated and caused engine stop. | |
| 27 | Low Bat. Volt Active | | An aux. output relay will be energized when low battery is occurred. | |
| 28 | Aux. In 3 Active | | An aux. output relay will be energized when the auxiliary input 3 activated and caused engine stop. | |
| 29 | Over Crank | | An aux. output relay will be energized when over crank is occurred. | |
| 30 | High Coolant Temp. Active | | An aux. output relay will be energized if there is a stop fault occurred due to high coolant temperature detected by high coolant temperature switch. | |

| Item | Function name | Description |
|------|------------------------|--|
| 31 | Over Speed Active | An aux. output relay will be energized when over speed fault is occurred. |
| 32 | Low Lube Press. Active | An aux. output relay will be energized if there is a fault occurred due to the low oil pressure detected by low oil pressure switch. |
| 33 | Aux. In 0 Active | An aux. output relay will be energized when the auxiliary input 0 activated and cause engine stop. |
| 34 | Not Auto Position | An aux. output relay will be energized when rotary switch is not in auto position. |
| 35 | Manual Start | An aux. output relay will be energized while system is running by manual start command. |
| 36 | Auto Start | An aux. output relay will be energized while system is running by auto start command. |
| 37 | Remote Position | An aux. output relay will be energized when rotary switch is in network position. |
| 38 | High Battery Volt | An aux. output relay will be energized when the DC voltage is greater than the setting of high battery volt. |
| 39 | Idle | An aux. output relay will be energized when system is in idle procedure. |

3.3.4 Misc. page



| Item | Name | Default | Range | Description |
|------|-------------------------------|------------|----------------------|--|
| 1 | Safety on timer | 10 Sec. | 3 ~ 20 Sec. | All alarms are ignored until safety on timer expired, except the emergency stop, over speed. |
| 2 | De-bounce | 50 | 5 ~ 200 | De bounce time can avoid the interference by Electronic or magnetic. |
| 3 | Controller Address | 41 H | 01 ~ FF H | Controller address is for identification while multiple controllers connected in the same network. |
| 4 | System not auto | Checked | Checked / Un-checked | Checked means enable this function. Controller gives an alarm signal when the position of rotary switch is not in auto position. |
| 5 | Low speed engine | Un-checked | Checked / Un-checked | Checked means enable this function. The frequency vale multiple 20 as engine speed if checked otherwise multiple 30. For example, if the rated frequency is 60.0 Hz and the low speed engine is checked, then the engine speed is equal to 1200 rpm ($60.0 * 20 = 1200$ rpm). |
| 6 | Not cooling while manual stop | Checked | Checked / Un-checked | Checked means enable this function. While manual stop, the controller will stop the engine immediately if this function is enable. Otherwise the controller will run in to cooling mode. |